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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,271	08/20/2003	Maurice E. Lindsay	LINDSA-44337	7242

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EXAMINER


RAABE, CHRISTOPHER M

ART UNIT PAPER NUMBER

2879

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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/645,271	<b>Applicant(s)</b> LINDSAY, MAURICE E. 	
	<b>Examiner</b> Christopher M. Raabe	<b>Art Unit</b> 2879	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/20/03</u> . | 6) <input type="checkbox"/> Other: ____.  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,3-10,12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. (U.S. Pre-grant Publication 2002/0079800), in view of Suckewer et al. (U.S. Patent 6131542).

With regard to claim 1,

Miyashita et al. disclose a spark plug comprising: an elongated tubular housing having a central longitudinal axis and forming an inner chamber therein (5 of fig 1), the housing including a terminal at one end thereof (13 of fig 1) and a base having an internal side wall at an opposite end (5 of fig 1, opposite 13 of fig 1, and 5 of fig 2); at least one ground prong extending from the base and towards the central longitudinal axis of the housing to an end referred to as P (4 of fig 1); an insulator mounted within the inner chamber of the housing, having at least a portion which extends from the base, at a point referred to as W, along the central longitudinal axis and tapers to a core nose, a circular portion of which that is closest to P referred to as S (3 of figs 1,2), resulting in an air space formed between S and P referred to as A (g<sub>2</sub> of fig 2); and an electrode embedded within the insulator, a tip of which protrudes from the insulator, the electrode having an exterior ring thereof which is closest to P referred to as E, P being closer to E than to W, P to E forming an electrical path which is different than the electrical path from E to S to A to P (2 of figs 1,2), the electrical resistance of P to E being greater than the electrical resistance of E to S to A to P, and the electrical resistance from E to S to W being greater than the electrical resistance of E to S to A to P, whereby a generated spark travels from E of the electrode to S of the insulator across air gap A to P of the ground electrode (paragraph 17). Miyashita et al. do not disclose a spark plug wherein a portion of the internal side wall comprises platinum-plating, and wherein the platinum plating of the internal side wall forms a reactive chamber that creates a plasma of fuel and air when the spark ignites

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the fuel. Suckewer et al. do disclose a spark plug wherein a portion of the internal side wall comprises platinum-plating (column 8, lines 21-24), and wherein the platinum plating of the internal side wall forms a reactive chamber that creates a plasma of fuel and air when the spark ignites the fuel (column 7, line 59-column 8, line 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the platinum-plating and plasma creating of Suckewer et al. into the spark plug of Miyashita et al. in order to reduce erosion (column 8, line 24 of Suckewer et al.) and enlarge the ignition kernel (column 1, lines 36-38 of Scukerwer et al.).

With regard to claim 3,

Miyashita et al. disclose the spark plug, wherein the at least one ground prong extends beyond the insulator (3,4,h of fig 5).

With regard to claim 4,

Miyashita et al. disclose the spark plug, wherein the at least one ground prong and a terminal end of the insulator are aligned (3,4 of fig 2).

With regard to claim 5,

Miyashita et al. disclose the spark plug, including a ground ring connected to the base from which the at least one ground prong extends (5 between 6,4 of fig 3(a)).

With regard to claim 6,

Miyashita et al. disclose the spark plug, wherein the at least one ground prong has sharp edges (4e,f of fig 2).

With regard to claim 7,

Miyashita et al. disclose the spark plug, wherein multiple ground prongs extend from the base (left and right 4 of fig 3(a)).

With regard to claim 8,

Miyashita et al. disclose the spark plug, wherein the portion of the insulator extending from the base is substantially frustroconical in shape (3 of figs 3(a), 5).

With regard to claim 9,

Miyashita et al. disclose the spark plug, wherein the spark travel is such so as to clean the insulator of surface deposits (paragraph 5).

With regard to claim 10,

Miyashita et al. disclose a spark plug, comprising: an elongated tubular housing having a central longitudinal axis and forming an inner chamber therein (5 of fig 1), the housing including a terminal at one end thereof (13 of fig 1) and a base having an internal side wall at an opposite end (5 opposite 13 of figs 1,2); a ground ring connected to the base (5 between 6,4 of fig 3(a) and having multiple prongs each extending therefrom and towards the central longitudinal axis of the housing to an end referred to as P (left and right 4 of fig 3(a)); an insulator mounted within the inner chamber of the housing, having at least a portion which extends from the base, at a point referred to as W, along the central longitudinal axis and tapers to a core nose, a circular portion of which that is closest to P referred to as S (3 of fig 3(a)), resulting in an air space formed between S and P referred to as A ( $g_2$  of fig 3(a)); and an

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electrode embedded within the insulator, a tip of which protrudes from the insulator, the electrode having an exterior ring thereof which is closest to P referred to as E, P being closer to E than to W, P to E forming an electrical path which is different than the electrical path from E to S to A to P (2 of fig 3(a)), the electrical resistance of P to E being greater than the electrical resistance of E to S to A to P, and the electrical resistance from E to S to W being greater than the electrical resistance of E to S to A to P, whereby a generated spark travels from E of the electrode to S of the insulator across air gap A to P of the ground electrode (paragraph 17) and the spark travel is such so as to clean the insulator of surface deposits (paragraph 5). Miyashita et al. do not disclose a spark plug wherein a portion of the internal side wall comprises platinum-plating, and wherein the platinum plating of the internal side wall forms a reactive chamber that creates a plasma of fuel and air when the spark ignites the fuel. Suckewer et al. do disclose a spark plug wherein a portion of the internal side wall comprises platinum-plating (column 8, lines 21-24), and wherein the platinum plating of the internal side wall forms a reactive chamber that creates a plasma of fuel and air when the spark ignites the fuel (column 7, line 59-column 8, line 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the platinum-plating and plasma creating of Suckewer et al. into the spark plug of Miyashita et al. in order to reduce erosion (column 8, line 24 of Suckewer et al.) and enlarge the ignition kernel (column 1, lines 36-38 of Suckewer et al.).

With regard to claim 12,

Miyashita et al. disclose the spark plug, wherein the at least one ground prong (should read "at least one of the prongs" or "the prongs" due to dependence on claim 10) extends beyond the insulator (3,4,h of fig 5).

With regard to claim 13,

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Miyashita et al. disclose the spark plug, wherein the at least one ground prong (should read "at least one of the prongs" or "the prongs" due to dependence on claim 10) and a terminal end of the insulator are aligned (3,4 of fig 3(a)).

With regard to claim 14,

Miyashita et al. disclose the spark plug, wherein the ground prongs have sharp edges (4f,e of fig 3(a)).

With regard to claim 15,

Miyashita et al. disclose the spark plug, wherein the portion of the insulator extending from the base is substantially frustoconical in shape (3 of figs 3(a),5).

3. Claims 16-19, 2,11 rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. in view of Suckewer et al. as applied to claims 1,10 above, and further in view of Nishida et al. (U.S. Patent 4476412).

With regard to claim 16,

Miyashita et al. disclose a spark plug, comprising: an elongated tubular housing having a central longitudinal axis and forming an inner chamber therein (5 of fig 1), the housing including a terminal at one end thereof (13 of fig 1) and a base having an internal side wall at an opposite end (5 opposite 13 of figs 1,2); a ground ring connected to the base (5 between 4,6 of fig 3(a)) and having multiple prongs each extending therefrom and towards the central longitudinal axis of the housing to an end referred to as P (left and right 4 of fig 3(a)) having sharp edges (4e,f of fig 3(a)); an insulator mounted within the inner chamber of the housing, having at least a portion which extends from the base, at a point referred to as W, along the

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central longitudinal axis and tapers in a frustoconical shape to a core nose, a circular portion of which that is closest to P referred to as S (3 of figs 3(a),5), resulting in an air space formed between S and P referred to as A ( $g_2$  of fig 3(a)); and an electrode embedded within the insulator, a tip of which protrudes from the insulator, the electrode having an exterior ring thereof which is closest to P referred to as E, P being closer to E than to W, P to E forming an electrical path which is different than the electrical path from E to S to A to P (2 of fig 3(a)), the electrical resistance of P to E being greater than the electrical resistance of E to S to A to P, and the electrical resistance from E to S to W being greater than the electrical resistance of E to S to A to P, whereby a generated spark travels from E of the electrode to S of the insulator across air gap A to P of the ground electrode (paragraph 17), the spark travel is such so as to clean the insulator of surface deposits (paragraph 5). Miyashita et al. do not disclose a spark plug wherein the energy requirements for the spark plug do not increase linearly with increased combustion chamber pressure, a portion of the internal side wall comprises platinum-plating, and wherein the platinum plating of the internal side wall forms a reactive chamber that creates a plasma of fuel and air when the spark ignites the fuel. Nishida et al. do disclose a spark plug wherein the energy requirements for the spark plug do not increase linearly with increased combustion chamber pressure (column 2, lines 13-26). Suckewer et al. do disclose a spark plug wherein a portion of the internal side wall comprises platinum-plating (column 8, lines 21-24), and wherein the platinum plating of the internal side wall forms a reactive chamber that creates a plasma of fuel and air when the spark ignites the fuel (column 7, line 59-column 8, line 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the energy requirements not increasing linearly, disclosed by Nishida et al. and the platinum-plating and plasma creating of Suckewer et al. into the spark plug of Miyashita et al. in order to make the spark plug useful in high compression ratio engines (column 2, lines 13-26 of Nishida et al), reduce erosion (column 8, line 24 of Suckewer et al.) and enlarge the ignition kernel (column 1, lines 36-38 of Suckewer et al.).

With regard to claim 17,

Miyashita et al. disclose the spark plug. Miyashita et al. do not disclose a spark plug wherein the insulator extends beyond the at least one ground prong (should read "at least one



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of the prongs" or "the prongs" due to dependence on claim 16). Nishida et al. do disclose a spark plug wherein the insulator extends beyond the at least one ground prong (column 2, lines 1-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the configuration of Nishida et al. into the spark plug of Miyashita et al. in order to increase the area of insulator cleaned of surface deposits.

With regard to claim 18,

Miyashita et al. disclose the spark plug, wherein the at least one ground prong (should read "at least one of the prongs" or "the prongs" due to dependence on claim 16) extends beyond the insulator (3,4,h of fig 5).

With regard to claim 19,

Miyashita et al. disclose the spark plug, wherein the at least one ground prong (should read "at least one of the prongs" or "the prongs" due to dependence on claim 16) and a terminal end of the insulator are aligned (3,4 of fig 3(a)).

With regard to claim 2,

Miyashita et al. disclose the spark plug. Miyashita et al. do not disclose a spark plug wherein the insulator extends beyond the at least one ground prong. Nishida et al. do disclose a spark plug wherein the insulator extends beyond the at least one ground prong (column 2, lines 1-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the configuration of Nishida et al. into the spark plug of Miyashita et al. in order to increase the area of insulator cleaned of surface deposits.

With regard to claim 11,

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Miyashita et al. disclose the spark plug. Miyashita et al. do not disclose a spark plug wherein the insulator extends beyond the at least one ground prong (should read "at least one of the prongs" or "the prongs" due to dependence on claim 10). Nishida et al. do disclose a spark plug wherein the insulator extends beyond the at least one ground prong (column 2, lines 1-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the configuration of Nishida et al. into the spark plug of Miyashita et al. in order to increase the area of insulator cleaned of surface deposits.

### ***Conclusion***


4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patents (6662793, 6531809, 5821676, 4439707).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Raabe whose telephone number is 571-272-8434. The examiner can normally be reached on m-f 7am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CR

  
**ASHOK PATEL**  
**PRIMARY EXAMINER**